

What is claimed is:

1. An as-grown single crystal of alkaline earth metal fluoride produced by a single crystal pulling method and having a straight barrel part diameter of not less than 17 cm and a light transmittance, as measured at a wavelength of 632.8 nm, of not less than 80%.
2. The as-grown single crystal of alkaline earth metal fluoride as claimed in claim 1, wherein the main crystal growth plane is the {111}plane.
3. The as-grown single crystal of alkaline earth metal fluoride as claimed in claim 1, wherein the main crystal growth plane is the {100}plane.
4. The as-grown single crystal of alkaline earth metal fluoride as claimed in any one of claims 1 to 3, wherein the straight barrel part has a length of not less than 5 cm.
5. The as-grown single crystal of alkaline earth metal fluoride as claimed in any one of claims 1 to 4, wherein the alkaline earth metal fluoride is calcium fluoride.

6. The as-grown single crystal of alkaline earth metal fluoride as claimed in any one of claims 1 to 4, wherein the alkaline earth metal fluoride is barium fluoride.